

Application/Control No. 10/690, 473
Art Unit: 3683
Amdt: December 18, 2006
Reply to Notice of Non – Compliant Amendment

Amendment to Background of Invention

This listing of background of invention will be a little bit corrected and will be underlined.

Altogether 38 sheets of paper, 10 sheets of drawing

AMENDMENT – Page 2

BACKGROUND OF INVENTION

I. Field of the Invention

This invention relates to vehicle. specifically, it relates to brake system, especially wheel cylinder air bleeding work and caliper air bleeding work.

II. Background art

Why we should do air bleeding work, is without air bleeding, if cylinder got air, the vehicle doesn't stop properly and can make accident. So we have to do air bleeding work perfectly. Cases of getting air in the cylinder is wheel cylinder change occasion or wheel cylinder piston cup change or vapour lock occur or caliper change and caliper flexible leaking hose change occasion.

Like these occasion we have to do air bleeding work from the air bleeding nipple. So the air bleeding nipple is frequently stuck up occasion or the vapour lock occur, we have to get trouble time occasion or the working room for moving hand for the air bleeding work is very small or can not reach easily, so like these trouble occasion, in order to save efforts and time, we use half auto air bleeding cylinder for the more easy way.

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Amendment to the Brief Summary of the Invention

This listing of the brief summary of the invention will be a little bit corrected and will be underlined.

Altogether 38 sheets of paper, 10 sheets of drawing

AMENDMENT – Page 5

BRIEF SUMMARY OF THE INVENTION

At the Auto repair shop, if the auto mechanic changes the wheel cylinder because of the wheel cylinder leaking. After change of the wheel cylinder the auto mechanic should do air bleeding work from the wheel cylinder nipple by loosening and tightening the nipple.

- (a) The wheel cylinder nipple when by loosening time one person pushes step on the brake pedal and the other person loosens the wheel cylinder nipple.
- (b) At this time from the wheel cylinder the air and brake oil bursting come out.
- (c) This work is, we can call, “air bleeding work”.
- (d) Exact air bleeding work is that one person steps on the brake pedal and repeats a few times.
- (e) And holding step on the brake pedal, it gathers the air around the nipple inside.
- (f) And the person loosens the nipple, the air and the brake oil bursting come out.
- (g) And tighten the nipple, if we do like this work a few times, the air bleeding work is being done,
- (h) Like this type of air bleeding is general air bleeding.

Altogether 38 sheets of paper, 10 sheets of drawing

BRIEF SUMMARY OF THE INVENTION

This invention makes air bleeding work more easy way, so save efforts and a lot of times

In case of jumbo air plane, save two hours and six persons' efforts and working.

If with wheel the helicopter is trying to do the air bleeding work, it saves a lot of troubles and time and work, if we use half auto air bleeding cylinder. If in a case of vapour lock occur in the wheel cylinder, half auto air bleeding cylinder solves the problem easy way.

- (a) In order to do half auto air bleeding, one person watches out of the master cylinder because brake oil should not be exhausted and keep going filled up the master cylinder.
- (b) And the other person select the switch, we can call it push down and select switch, whose wheel cylinder is trying to do the air bleeding work.
- (c) And then the person pushes step on the brake pedal a few times, it gathers the air, near the air bleeding hole and release the brake pedal.
- (d) And pushes, push down switch and then electric magnet is working.
- (e) And so then the electric magnets withdraw the blocking two keys from the piston side.
- (f) And then pushes step on the brake pedal a few times, at this time keep going on pressing the push down switch.

BRIEF SUMMARY OF THE INVENTION

- (g) And then the air and oil bursting come out. Because unlocked piston is working.
- (h) And then release the brake pedal.
- (i) So the big piston is coming down to the end by the spring pressure.
- (j) And then release the push down switch and the big piston is locking by the key and the keys' reaction spring.
- (k) This is a one time finish air bleeding work and a few times repeat, air bleeding work is accomplished.
- (l) Like these way, we can select the wheel, which wheel we have to do air bleeding and then finish every wheels' air bleeding work.

Amendment to the Brief Description of the Several Views of the Drawing:

This listing of brief description of the several views of the drawing will be added at the end of the portion, because 4 pages of drawing (Fig.3.C., Fig.3.D., Fig.4.A., Fig.4.D.) is added for some more detail explanation, and will be a little bit corrected and will be underlined.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

This half auto air bleeding cylinder solves the air bleeding problem faster and easy way.

Drawing Figures

Fig. 1. is the simple drawing for understanding

Fig. 2A, at this drawing, is appeared electric magnets and bullet piston and keys.

These things make, half auto air bleeding cylinder, working possible.

Fig. 2.B. shows, push down and select switch how to work with electric magnet and it's combination working.

Fig. 2.C. shows needle bearing, for more easy way key's sliding.

Fig. 3.A. shows different type of half auto air bleeding cylinder and shows to change electric magnetic pole changing minus to plus and shows shifting rod how to move by the switch.

Fig. 3.B. shows different type of Fig. 3.A. by using cable and lever.

Fig. 3.C. shows enough return spring 57, 39 and sustain bracket and guider and connections. Fig.3.C. shows detail of Fig.3B.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

Drawing Figures

Fig.3.D. is a different type of Fig.3.B., just lifting up type is different and under the vehicle device is all same.

Fig.4.A. is how to keep switch safty (at the Fig.2.B. & Fig.3.A.) and, if we lost key at the emergency time, using needle punch and small hammer, at the portion of the connection, take out the key and lift up the cover and we can use the switch.

Fig.4.B. shows how to lock for the safty, in case of Fig.3.C., or in case of Fig.3.D. It is the same lock but the hole position is different. How to lock and, if we lost key at the emergency time, we use small punch and hammer, we can open the lock key, and normally we can do half auto air bleeding work.

Amendment to the Reference Numerals In Drawings:

This listing of the reference numerals in drawings will be a little bit corrected and will be added at the end of the portion, because some more detail drawings is added.

And new reference numerals will be underlined.

Reference Numerals in Drawings

- | | | |
|----|---|---|
| 4 | push down switch in the push down and select switch = p.s. switch | |
| 5 | needle bearing | 6 electric magnet |
| 7 | spring | 8 bullet piston |
| 9 | air bleeding hole | 10 wheel cylinder |
| 11 | disconnecting heat material | 12 big piston |
| 13 | key=lock key | 14 stream line, fish type rod
every rod is stream line type
and got strong little bit of fin
just like fish = piston rod |
| 15 | spring | 16 spring |
| 17 | spring | 18 select switch in the push down and select switch |
| 19 | push down and select switch | 20 push down and select switch
= p.s. switch |
| 21 | guide of key | 22 electric magnet |
| 23 | seal | 24 piston = big piston |
| 25 | key = lock key | 26 needle bearing |
| 27 | shifting magnetic rod | 28 piston seat |
| 29 | dust cover hair | |
| 31 | disconnecting heat material | 32 top button = push down button,
in the plus minus changing
push down and select switch |

Reference Numerals In Drawings

- | | |
|---|--|
| 33 air bleeding hole | 34 select switch, in the plus minus changing push down and select switch, so we call it P.M.C. push down and select switch. More abbreviation, P.M.C.P.S. switch |
| 35 double electric wire | 36 not acme, but long line spiral, so easy way turn sliding and get a little resistance |
| 37 air stuck up hole | 38 plus minus changing push down and select switch. = P.M.C.P.S. switch |
| <u>39 strong return spring</u> | 10 wheel cylinder |
| 40 piston rod | 41 lift up and down lever |
| 42 release key lever | 43 air stuck up hole |
| 44 air bleeding hole | 45 piston seat |
| 46 dust cover hair | 10 wheel cylinder |
| <u>47 strong return spring</u> | 48 light |
| <u>49 wrapped on rubber and wire string cover</u> | <u>50 adjusting connection</u> |
| 51 Just like gasket | 52 seal |
| 53 dust cover | 54 battery |
| <u>56 supporter</u> | <u>57. Wire return spring and holder</u> |
| 58. (cancelled) plastic guide | <u>59. 62. go to 59. portion</u> |

Reference Numerals In Drawings (cont.)

- | | |
|---|--|
| <u>60 shifting lever which we want to do air bleeding wheel cylinder, for air bleeding work, 60. go to 61. groove</u> | <u>61 groove, for receiving lifted up and shifted 60.</u> |
| | <u>62 which way to connection of the cable.</u>
<u>(e.g.) rear left wheel cable</u>
<u>(e.g.) rear right wheel cable</u> |
| <u>63 empty space for working 64.</u> | <u>64 by lifted up 41 lever, holding gear by 42.</u> |
| <u>65 Wire return spring sustain bracket.</u> | <u>66 at the Fig.3.C. type, sustain help guider bracket, by center No.41 left side No.66, right side No.66 for No.60.</u>
<u>at the Fig.3.D. type sustain help guider bracket, around under the hole 121,122, 123 and one more, or 9 more hole.</u> |
| <u>67 at Fig.3.C. type, cable holder at No. 59 portion. Each No.60 get a No.67, and Fig.3.D type, cable holder at 121, 122, 123 and one more, or 9 more, under the hole 121, 122, 123 and one more, or 9 more hole.</u> | <u>68 double nut.</u> |
| <u>69 going up and down connection link rod</u> | <u>70 from 82, 72, 71, push up power, 70 give to 69</u> |
| <u>71 by 82 and 72, 71 push down 87, 87 pushes 86 to 75 way, 125 groove get 88, and 76 way up and down with 86, 87, 83, 118, 89, 82 to together.</u> | <u>72 by 82, 72 up and down connection link rod</u> |
| <u>73 center link supporter rod, fixed up at the 118 bar center portion and 76 way up and down</u> | <u>74 center link connection, fixed up at 118 bar, and working</u> |

Reference Numerals In Drawing

75 push down 82, so the connection link and rod combination working, let 87, 86 move 75 way and 125 groove receive 88 and 76 way up and down

76 push down 82, the combination working of connection link and rod let 87, 86 move to 75 way, and the 125 groove receive 88, and then grip 89 lift up in spite of spring device 65, 57 and 39, 120 spring, 83 which is assembled by each half circle pole is lifted up from 126, 79, 101 because 118 portion bite strongly the top of the 83 =119, and so 76 way 88 the stick ball is lifted up properly, we can do air bleeding and grip 82, 89 together down 76 way by spring device 65, 57 and 39, 120 spring, so 118=83, one body, right back at that position to the top of 126, and the piston rod 40 right back at that position.

78 empty space

80 80 is for receiving 125 groove, 88 stick ball accept 125 groove

81 83 each half circle pole is assembled by this 81 bolt

83 118, 119, 82, 89, 86, 87, 85, together, at a time one body working with 83

77 key box hole, 124 go into this hole

79 which is assembled by each half circle pole and bracket 126, 90, and get 83 inside, by slightly around gap.

82 push down grip

84 split gap between 118 and 126, and there are the position notches which we want to do air bleeding wheel cylinder.

Reference Numerals In Drawing

85 return spring

86 for lifting up 88 stick ball, connection
link rod

87 for moving 86 to 75 way, connection
link rod

88 just like 60 which we want to do air
bleeding wheel cylinder, for air bleeding,
88 go to 121, 122, 123, and the other
hole.

89 lift up grip

90 support bracket

91 lock key box hole 124 key box go in
and out, lock and open

92 turn around 92 way the key box is locked

93 turn around 93 way the key box is open

94 95 is folding is 94, can take out from the
hole 91, 77 to 100. It means unlock.

95 lock situation

96 small punch

97 hammer

98 99 key center is come out and empty key
box

99 lock key center

100 folding94 key box can take out 100 way

101 together with 79, 101 is assembled by
each half circle pole, 101 is bracket
and one body with 79

102 key center holder

103 key box center

104 split pin

105 washer

106 connection link

107 key box

108 folding connection

Reference Numerals In Drawing

<u>109 electric wire</u>	<u>110 electric wire at the switch end portion</u>
<u>111 switch</u>	<u>112 switch protecting cover</u>
<u>113 normally open way</u>	<u>114 connection key pin</u>
<u>115 very small punch</u>	<u>116 lost the key and emergency time open Way</u>
<u>117 key box</u>	<u>118 lifting up whole body supporter</u>
<u>119 top of 83 portion is bitten at 119 portion and stuck up by 118 portion</u>	<u>120 return spring and turning around return spring (torsion spring)</u>
<u>121 under the 121 hole, 67 cable holder come</u>	<u>122 under the 122 hole, 67 cable holder come</u>
<u>123 under the 123 hole, 67 cable holder come</u>	<u>124 into 91, 77 key hole, 124 key box go in and lock, so can not lift up</u>
<u>125 groove, for lifting up the 88 stick ball</u>	<u>126 sustain bracket. With 79, one body=101</u>
<u>127 connection link bolt pipe</u>	<u>128 69 connection going up and down guide</u>
<u>129 72 connection coming down guide</u>	<u>130 piston for closing for 43 hole, and 44 hole</u>
<u>131 seal</u>	

Amendment to the Detailed Description of the Invention:

This listing of the detailed description of the invention will be corrected at the some portion and will be underlined, and will be added at the end of the portion, because some more detail drawings is added.

Detailed Description of the Invention

Fig. 1. Shows how to work for air bleeding automatically.

Like this method can be used for any other field.

Fig. 2A. shows half auto air bleeding cylinder. How to work is like these, at first, select 18 which wheel cylinder we want to do air bleeding, and pushes step on the brake pedal a few times, and release the brake pedal, the air gather together near 8 head. And then pushes 4 and keep going on pushing down, 6 is working and 13 is withdrawed from 12. Right this time pushes step on the brake pedal, 12 and 14 goes up in spite of 17, 15, 16 pressure and 8 come down and the air with the brake oil bursting come out from 9 and then release the brake pedal and release 4. 12 and 14 is coming down by 17, 15, 16 and after 12 is right back right at position, 12 is locked by 13. At this time 13 is moving by 7, and 12 is locked by 13. And this is a one time air bleeding work accomplished. And so we can do a few times repeat, the air bleeding work is done.

From the beginning of the air bleeding work, brake master cylinder cover should be opened and be filled with brake oil enough and should be checked not to be exhausted.

Fig. 2B. shows how to work 20 and working 6. If we need air bleeding from right rear wheel, we can select and can do air bleeding work. If we want to see 6 is working, select 18 which wheel we need air bleeding and push down 4. 6 is working, and it makes that 13 is withdrawed from 12.

Detailed Description of the Invention

Fig.2.C. shows that 25 easy way come inside 24, the cause is 26, and 24 is easy way locked and opened by 25.

Fig. 3.A. shows different type of Fig.2.A. How to work is like these, at first, pushes step on the brake pedal a few times and select 34 which wheel cylinder we have to do air bleeding. And keep going on pushing 32, and 27 moves left side because of electric magnetic field and 37 is opened and then again pushes step on the brake pedal a few times, the air and oil bursting come out from 33. And then change electric magnetic pole changing minus to plus by 34, it makes 27 goes back right at that position, and release brake pedal and release 32. 37 is closed and 33 is closed. And pushes step on the brake pedal a few times and holding step on the brake pedal properly (by the free gap of brake pedal) and press 32 and keep going on pressing, it makes 27 move left side for opening 37 hole and 33. As soon as press 32, 27 moves left side, 37 hole and 33 hole is opened, and then pushes step on the brake pedal a few times, the air and oil bursting come out, because holding step on the brake pedal. In spite of holding step on the brake pedal, 27 moves right side because pressure is exhausted and electric magnetic field is strong enough, and so change electric magnetic pole changing minus to plus by 34, it makes 27 goes back right at that position, 37 is closed and 33 is closed. And release 32, and release brake pedal. So half auto air bleeding work is accomplished. And then repeat this work a few times, half auto air bleeding work is perfect finish.

Detailed description of the Invention

Fig. 3.B. shows different type of Fig. 3A. using different type of device and cable, and for understading for Fig.3.C., Fig.3.D., using different device and cable.

How to work is like these, at first, pushes step on the brake pedal a few times and holding step on the brake pedal properly (by the free gap of brake pedal), and lifts up 41 in spite of 39 pressure, 40 moves left side and, the air and oil bursting come out from 43 to 44 and a little bit lift up 41 and push down 42 and absolutely down 41, and then by 39, 40 goes back right at that position. This is a one time air bleeding accomplished and repeat a few times, the air bleeding work is accomplished.

Fig. 3.C. and Fig.3.D. shows different type of Fig. 3.A, using different type of device and cable. Fig.3.C. working is like these, at first pushes step on the brake pedal a few times and holding step on the pedal properly (by the free gap of brake pedal), and No.60. which we want to do air bleeding wheel cylinder, shifting to the 61 groove and lifts up 41 in spite of spring pressure and piston rod 40 and piston 130 moves left side and, pushes step on the brake pedal 4-5 times, some time 6-7 times and the air and oil bursting come out from 43to 44, holding brake pedal, and a little bit lift up 41 and push down 42 and absolutely down 41 and then by 57, 39 return spring, 130 and 40 goes back right at that position.

This is a one time air bleeding accomplished, some occasion one time is successful air bleeding work but some occasion repeat 2-3 times, and then the air bleeding work is accomplished, at this during time master cylinder should be filled.

Altogether 38 sheets of paper, 10 sheets of drawing

Detailed description of the Invention

Fig.3. D. is same with Fig.3.C, but lift up type and installed position is different and under the vehicle device is same with Fig.3.C. How to work is, at first, pushes step on the brake pedal a few times and pushes properly (by the free gap of brake pedal), and grip 89 and 82 together, but doesn't push down 82 grip, and select one of stick ball's position (within 4-12 position) among 121, 122, 123, ..., twelfth position, which we want to do air bleeding wheel cylinder by turning 89 grip (by notch inside 84 gap). Every 121, 122, 123, forth, sixth, eighth or twelfth position get a 80, so if we got selected one's position, just push down 82, 82 grip push down 72 connection link rod, 72 is sliding down, following guide 129, 72 sliding down power push down 71, 71 connection link rod push down 87, 87 pushes 86 to 75 way, 125 groove get 88, and lift up 89 grip 76 way in spite of 57, 39, 120 spring pressure, and the cable tension come from A way and B way and through the 66 bracket and through 67 portion, 62 portion, go in to the stick ball 88, so the cable is strong enough to lift up. Lifting up 89 grip 76 way, the piston 130 and piston rod 40 move left side and the 43 hole open and 44 hole open and so pushes step on the brake pedal a few times, the oil and air bursting come out and keep going on holding step on the brake pedal, and let down 89, 82 right back at that position and then release 82 grip, and so 86, 87, 125 go back right at that position by spring 85, and by 120 spring pressure (torsion spring), 118 is set down right back at that position on top of 126. (118, = 119, = 83 and 87, 86 is one body, and going up and down 76 way together). And release brake pedal, this is a one time air bleeding work, and a few times repeat we can finish air bleeding work

Altogether 38 sheets of paper, 10 sheets of drawing

Detailed description of the Invention

Fig.4.A. shows how to keep switch safety (the switch is at Fig.2.B. and at Fig.3.A.). 112 covers 111 switch, and through 108, and the cover 112 is locked and opened by the key box 107. The cover 112 is opened 113 way, is usual and we can use the switch.

If we lost the key at the emergency time, we can use needle punch 115 and small hammer 97 and take out the 114 connection key pin and lift up the cover 116 way and open and we can use the switch.

Fig.4.B. shows how to lock and open for the safety, in case of Fig.3.C., or in case of Fig.3.D. it is the same lock but the hole position is different in case of Fig.3.C. and Fig.3.D. How to lock and open is, at first, put in the key at 103 key box center and 92 way turning the key is locked, and 93 way turning the key is open. 124 key box is open, it means 95 is folded and we can put in the 124 into 91 hole (Fig.3.C.) or 77 key hole (Fig.3.D.). and then turn around the key 92 way, 95 is spread. It means the lifting up device is locked in case of Fig.3.C. or in case of Fig.3.D. and if we turn key 93 way, it makes key box 94 situation, so we can take out the key box 124 from 91 hole (Fig.3.C.) or from 77 key hole(Fig.3.D.).

So we can use lift up device, it means we can use Fig.3.C. device and Fig.3.D. device safety.

Detailed description of the Invention

If we lost key at the emergency time, we use 96 small punch and 97 hammer, we can open the lock key, by taking out the lock key center 99, and making 98 empty key box, and take out the empty key box 98 from 91 key hole (at Fig.3.C.), or from 77 key hole (atFig.3.D.) And normally we can do half auto air bleeding work. Because lock is opened, so we can lift up the device and cable

Amendment to the Conclusion, Ramifications, and Scope:

This listing of the conclusion, ramifications, and scope will be partially added.

Conclusion, Ramifications, and scope

Wheel cylinder change occasion or wheel cylinder piston cup change or vapor lock occur or caliper change and caliper flexible leaking hose change occasion, like these occasion we have to do air bleeding work from the air bleeding nipple.

So the air bleeding nipple is frequently stuck up occasion or the vapor lock occur, we have to get trouble time occasion or the working room for moving hand for the air bleeding work is very small or can not reach easily, so like these trouble occasion, in order to save efforts and time, we use half auto air bleeding cylinder.

This invention makes air bleeding work more easy way, so save efforts and a lot of time. In case of jumbo air plane, can save two hours and six persons, efforts and working.

With wheel the helicopter is trying to do the air bleeding work, save a lot of trouble, and time and work.

Conclusion, Ramifications, and scope

But in case of using cable half auto air bleeding cylinder, if it is using frozen area, it could be cause of the accident. In a rainy day, on the free way, if the auto vehicle under ground is splashed by the rain fall long time, it makes vehicle under ground moisten vaporizing condition or under of the auto vehicle is washed by steam washing for painting under of the auto vehicle, after these, if the weather is under frozen Fahrenheit, the inside cable moist water is frozen so the cable is stuck up for handling, even though some time the lever is lifted up but the cable wire do not return and the piston can not be returned in spite of return spring pressure so cable type is not proper in frozen area. But before the steam washing, we can do half auto air bleeding work by cable type. So it is up to expert vehicle repair person or a lot of vehicle repair experience person, and can do this job possibly.